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THE UNIVERSITY OF WASHINGTON

SEATTLE, WASHINGTON 98105

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PROGRESS REPORT NO. 8

for

EXPERIMENTAL AND THEORETICAL
INVESTIGATION OF WIND TUNNEL
GEOMETRY, EMPHASIZING
FACTORS PRESENT TO V/STOL
VEHICLE TESTING

for

The Period from March 16, 1968, to September 15, 1968

under

NASA Grant NGR-48-002-010

by

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Principal Investigator

SUMMARY

The following paragraphs describe briefly the work accomplished during the reporting period. Publication has been completed on one report, and another report has been accepted for publication in the Journal of Aircraft. A model and some specialized instrumentation has been designed and constructed in preparation for some experimental work, and some new personnel has been hired to improve our computing capability.

CONVERGING FLOW FIELD EFFECTS

This phase of the work was completed and a final report was submitted to NASA. This has now been published as NASA CR 1198.

WALL INTERFERENCE EFFECTS

The paper describing the work on a plane wing in a rectangular tunnel, which was published last period as an AIAA preprint, was accepted for publication in the AIAA Journal of Aircraft. The copy has been revised somewhat, and an additional example included. Final proofs have not yet been returned and a publication date is not available.

INTERNAL FLOW FIELD CALCULATIONS

Little progress has been made on this problem. Computer capacity has been a limiting factor. During the spring term a new graduate student was engaged to attack this part of the

problem. He reported to work in September and has begun to improve our computer methods to handle the greater detail needed to get improved solutions in this area.

EXPERIMENTAL PROGRAM

During the reporting period the principal effort has been on the setting up of an experimental program using a jet-flapped wing. Construction on this model is now complete and installation in the tunnel has begun. The first experimental work should begin during the fall term.

The model is of low aspect ratio (3) and will be blown to produce lift coefficients of the order of 4. Analytical methods used for the plane wing will have to be modified to fit the flapped wing, and the experimental results will be used as aids in constructing the proper analytical model.

The results most desired are the location of the wake trajectory and rate of rolling up of the trailing vortex systems. Some instrumentation has been developed and more is being studied. A vorticity meter has been constructed and tested during this summer. It is smaller than any previously known, and in preliminary tests has performed well. A hot wire anemometer system has been purchased and will be used to explore the wake. A preliminary design is being studied for a mechanism which will use the hot wire to integrate the velocity around a closed path to determine the circulation integral. The device is rather cumbersome mechanically, and we have not yet decided to construct it.